NTWB1

NMEA to WiFi Bridge

INSTALLATION & USER MANUAL

Rev 1.0
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MADMAN MARINE PTY LTD

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Chapter 1
Introduction

1.1 Overview

Illustration 1: NTWB1 NMEA to WiFi Bridge Parts Identification

Your Madman Marine NMEA to WiFi enables NMEA data to be broadcast over WiFi to up to seven (7) WiFi connected devices such as PCs, laptops, iPads, iPhones, and Android tablets & phones.

It has been designed for owner installation and is ready for use after making a few electrical connections.

1.2 Features

- Reverse polarity & voltage spike protected
- Automatic, self-resetting internal fuse
- Electrical isolation of data lines (up to +/- 50Vdc)
- Power saving 'sleep' mode with automatic wake up

1.3 Specifications

ELECTRICAL

Electrical Supply Voltage	7 to 15Vdc
Standby Current (sleep mode)	< 30mA
Operating Current	< 90mA
Internal Fuse Type	Self-resetting
Electrical Isolation (data lines)	+/- 50Vdc
Reverse Polarity Protected	Yes

WIFI

Standards	802.11b/g
SSID	Madman *xxxx* *(xxxx = last 4 characters of mac address)*
Mode	Access Point with DHCP
IP Address	169.254.1.1
Port	55555
Protocols	UDP or TCP
Simultaneous UDP Connections	7
Simultaneous TCP Connections	1
Transmitter Power	+12dbm

NMEA

Protocol	NMEA 0183
Baud Rate	4800 or 38400
Max. Talkers	1 *(single-ended)*
Max. Listeners	3 *(single-ended)*

1.4 Important Information

1.4.1 Disclaimer

Use the NTWB1 entirely at your own risk. Madman Marine Pty Ltd will not be held liable for any consequential loss, damage or injury in any way connected with the use of the NTWB1 NMEA to WiFi Bridge. Madman Marine Pty Ltd's liability under any circumstances shall not be greater than the original purchase price of the NTWB1.

1.4.2 Network Security

Since June 2014 all Madman Marine NTWB1 WiFi Bridges have been configured to use secure network authentication via WPA2-PSK.

NTWB1 WiFi Bridges sold prior to June 2014 created an open network with no authentication required.

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2.1 Installation

2.1.1 Overview

The NTWB1 can be mounted to any flat surface inside the boat's cabin where it will be protected from water and mechanical damage.

The NTWB1 does not need to be in direct line of sight of the WiFi devices which will connect to it so can be hidden out of view if desired, however the fewer obstructions between the NTWB1 and connected WiFi devices the better the reception performance will be.

2.1.2 Mounting Location

The following must be taken into account when selecting a mounting location:

- Room to attach the antenna,
- Ability to view the LED indicators,
- Obstructions between NTWB1 and other WiFi devices,
- Protection from water (including condensation) and mechanical damage,
- Proximity to equipment or cabling which could cause interference to or be interfered by the NTWB1.

There are two flanges on the NTWB1 enclosure which have holes provided for mounting to any flat surface with screws (2 required). Alternatively self-adhesive Velcro could be used to mount the NTWB1 in any convenient location. Refer to Illustration 2 for flange locations.

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Chapter 2
Installation

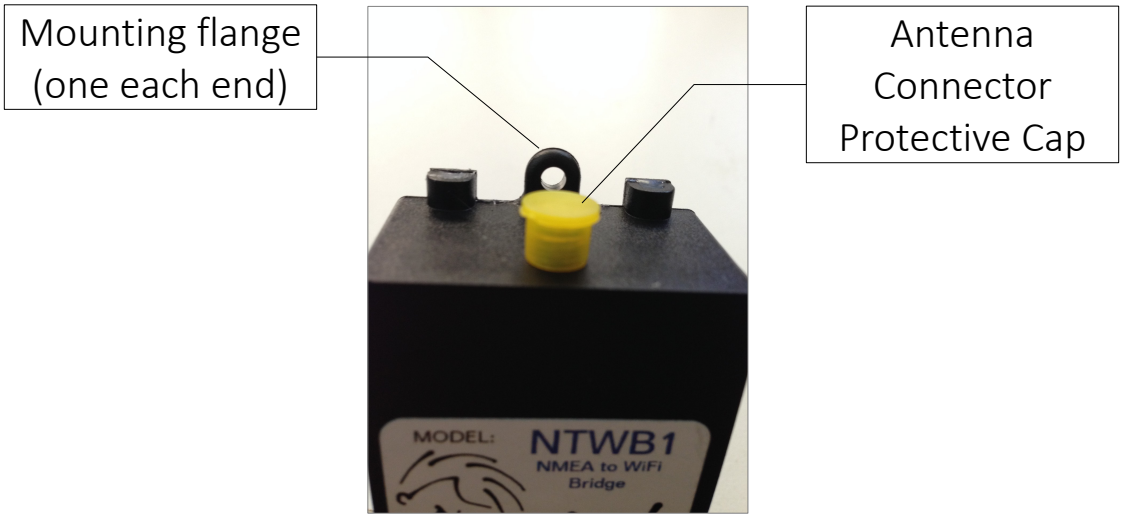


Illustration 2: Mounting Flange and Antenna Connector Protective Cap

2.2 Electrical Installation

2.2.1 Cable Route Considerations

Although the supplied cable has individually screened conductors to reduce the effects of interference from electromagnetic noise (EMI) care should still be taken in selecting the route the cable of the NTWB1 is to take. The cable should be kept as far as possible from the following items:

- radio transmitters,
- antennas and antenna cables,
- fluorescent lights,
- electrical cables carrying AC current,
- engines including outboard motors
- AC powered electrical equipment

Also avoid routing the cable near compasses or other sensitive instruments to avoid interference from the NTWB1.

2.2.2 Electrical Colour Code

The colour coding of the 4 cores of the NTWB1 cable is as follows:

Red	+12Vdc
Black	0Vdc
Yellow	NMEA data OUT (to Listeners)
White	NMEA data IN (from Talker)

2.2.3 Electrical Connections

Connect +12V to the red wire and 0V (negative) to the black wire. If you inadvertently reverse the polarity no damage will be done to the NTWB1. Simply reconnect with the correct polarity.
The White wire carries data to the NTWB1 from a NMEA talker. The Yellow wire carries NMEA data from the NTWB1 to NMEA listeners.
The NMEA connections are single-ended where the 'other side' is connected to 0V. This means where two wires (A/+ & B/-) are provided on your NMEA equipment for NMEA In only one wire (the A/+ wire) need be connected. This applies for the NMEA Out wires also.

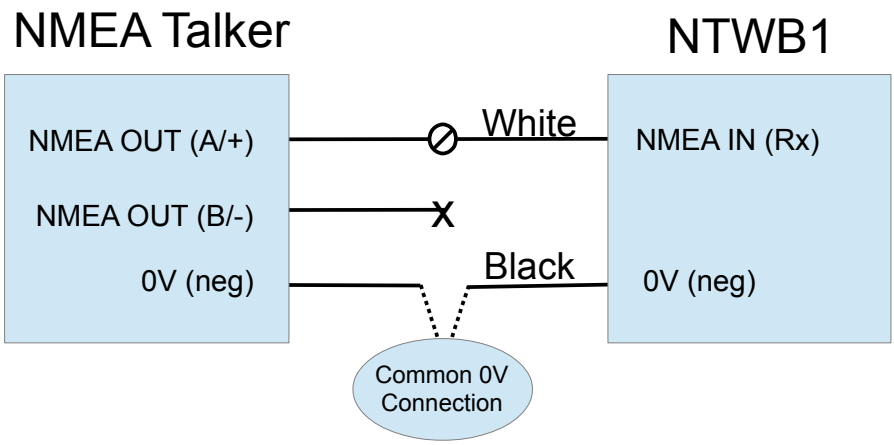
Refer to the specific instructions for the particular NMEA equipment you plan to connect for signal wire colours as the wire colours are not standardised between manufacturers.

Note: *The B/- wires may need to be connected to 0V (negative) if the single wire connection does not work. Refer to manufacturers instructions to check if this can be done without damaging the equipment.*

2.3 TYPICAL NMEA CONNECTIONS

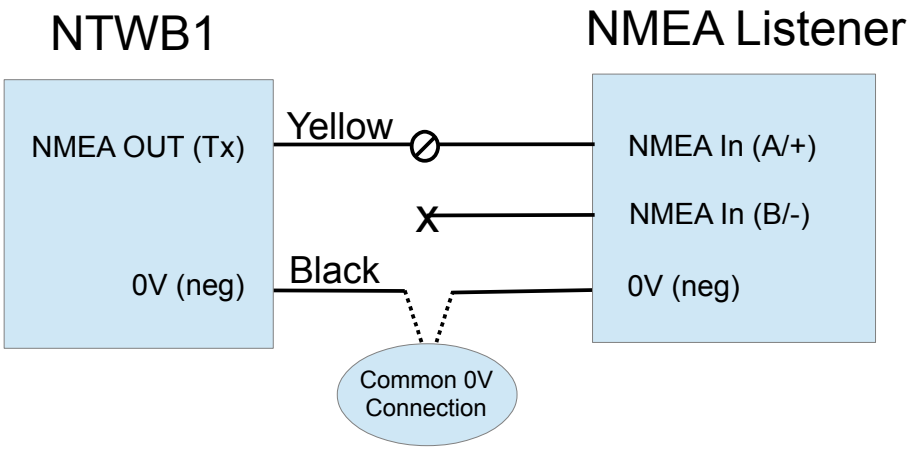
2.3.1 NMEA Talker to NTWB1 (NMEA to WiFi)

To send NMEA data from a wired NMEA device to a WiFi connected device, follow the diagram below. Baud rate must be 4800bps



2.3.2 NTWB1 to NMEA Listener (WiFi to NMEA)

To send NMEA data received from a WiFi connected device to a wired NMEA device, follow the diagram below. The baud rate is 4800bps.



3.1 Operation

3.1.1 Initial Steps

1. Ensure all electrical connections have been made correctly.
2. Screw the antenna on to the antenna socket if not already installed.
3. Turn on the 12V supply to the NTWB1
4. Check that the LED indicators are flashing green and red. (If NMEA data is available the orange LED will flash also).

3.1.2 Connecting a WiFi Device

1. Navigate to the WiFi settings on the device you wish to connect to the NTWB1.
2. Look for the 'Madman xxxx' SSID *(where xxxx is a mix of numbers and /or letters)* in the list of available WiFi networks. *See left image of Illustration 3 for iPhone example.*
3. Select the Madman xxxx network, enter the password when prompted and wait for your device to establish a WiFi connection. *See right image of Illustration 3 for iPhone example.*
4. When your WiFi device has connected to the NTWB1 the red LED will stop flashing and will remain off. If a TCP connection was made the green light will stay, on otherwise it will continue to flash.

3.1.3 Configuring Software

Refer to your app's or software's documentation for guidance on configuration to establish a TCP or UDP connection.
Generally, the three things to be configured are the protocol (TCP or UDP), the IP address of the source of the data (169.254.1.1) and the port (55555).

Chapter 3
Operation

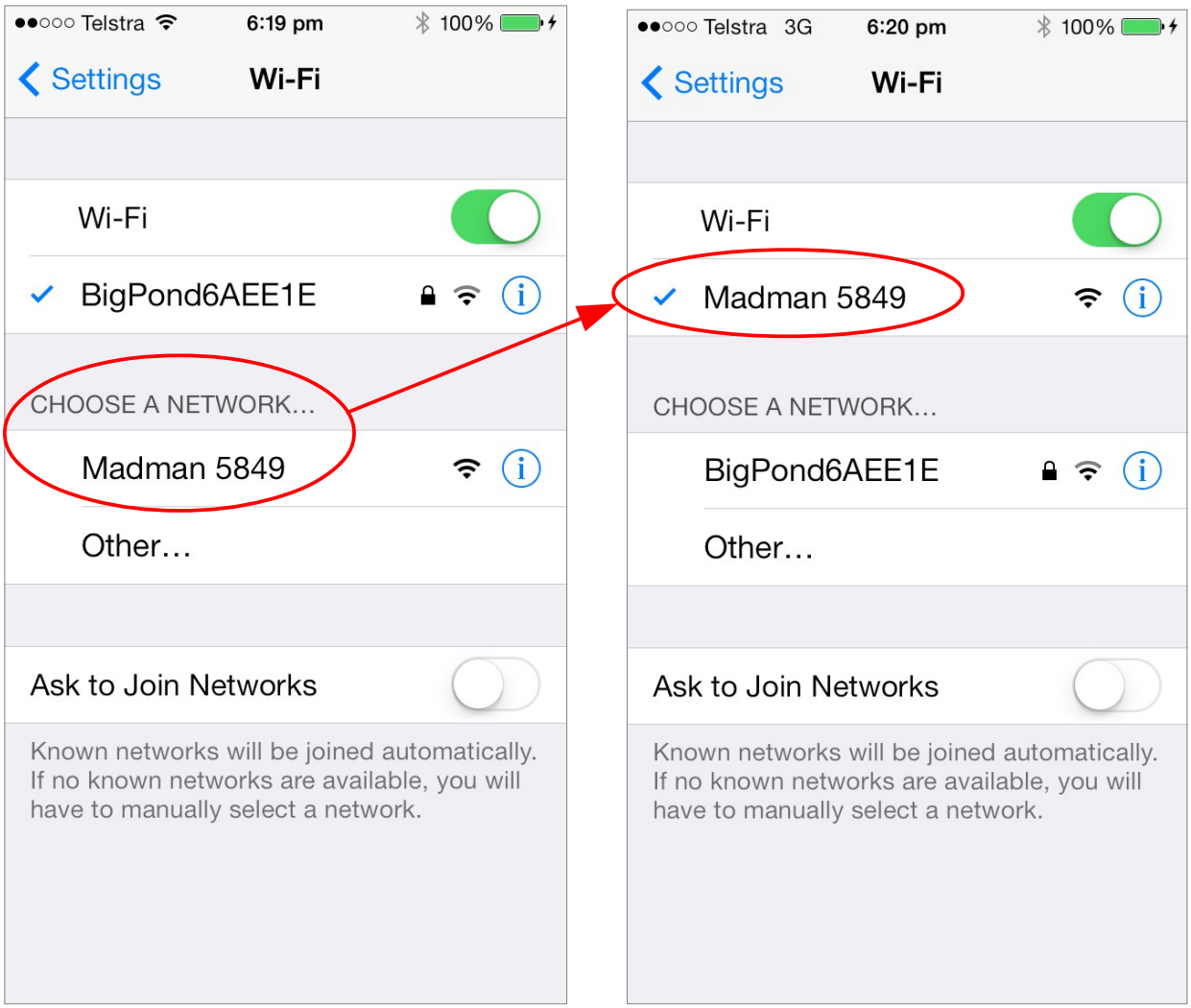

●●○○○ Telstra 6:19 pm 100%
Settings
Wi-Fi
Wi-Fi
BigPond6AEE1E
CHOOSE A NETWORK...
Madman 5849
Other...
Ask to Join Networks
Known networks will be joined automatically. If no known networks are available, you will have to manually select a network.
●●○○○ Telstra 3G 6:20 pm 100%
Settings
Wi-Fi
Wi-Fi
Madman 5849
CHOOSE A NETWORK...
BigPond6AEE1E
Other...
Ask to Join Networks
Known networks will be joined automatically. If no known networks are available, you will have to manually select a network.

Illustration 3: Connecting iPhone to NTWB1 - select the 'Madman xxxx' network from the list of available networks in WiFi settings (left) then wait for it to connect as indicated by the check mark (right).

3.1.4 Configuring iRegatta

To receive NMEA data from WiFi with iRegatta, go to Settings on your i-device then look for iRegatta in the list of apps towards the bottom of the page. Tap on the iRegatta icon and then scroll down to the 'WIFI NMEA' section. Set the options as below...

- WiFi Instrument data (Turn On)
- TCP/UDP (select either TCP or UDP)
- NMEA IP address 169.254.1.1
- NMEA Port no. 55555

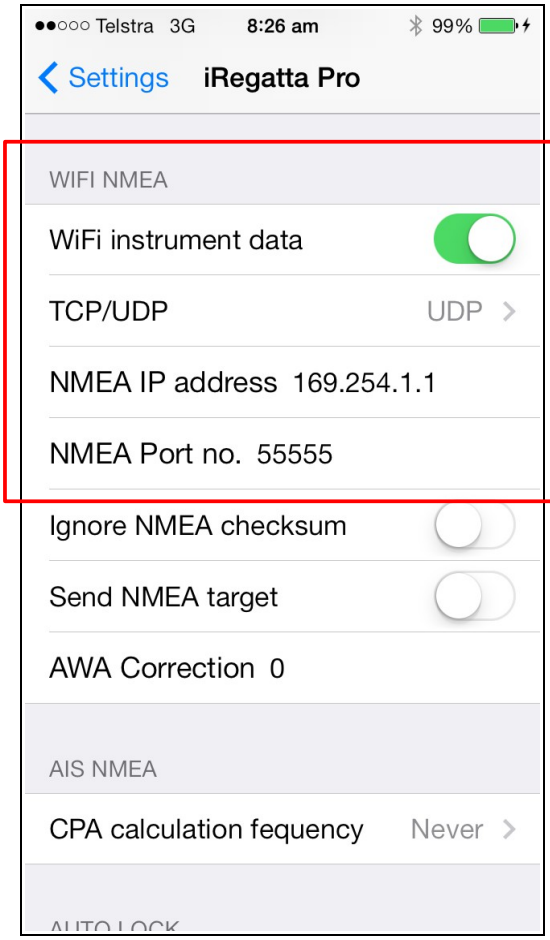


Illustration 4: iRegatta Settings for i-device

3.1.5 Configuring OpenCPN

Navigate to the Setttings page and select the 'Connections' tab. Add a new connection using the 'Add Connection' button. Select the desired protocol and enter the Address and DataPort as follows:

- Address 169.254.1.1
- DataPort 55555

Make sure the connection is enabled and click on OK to save.

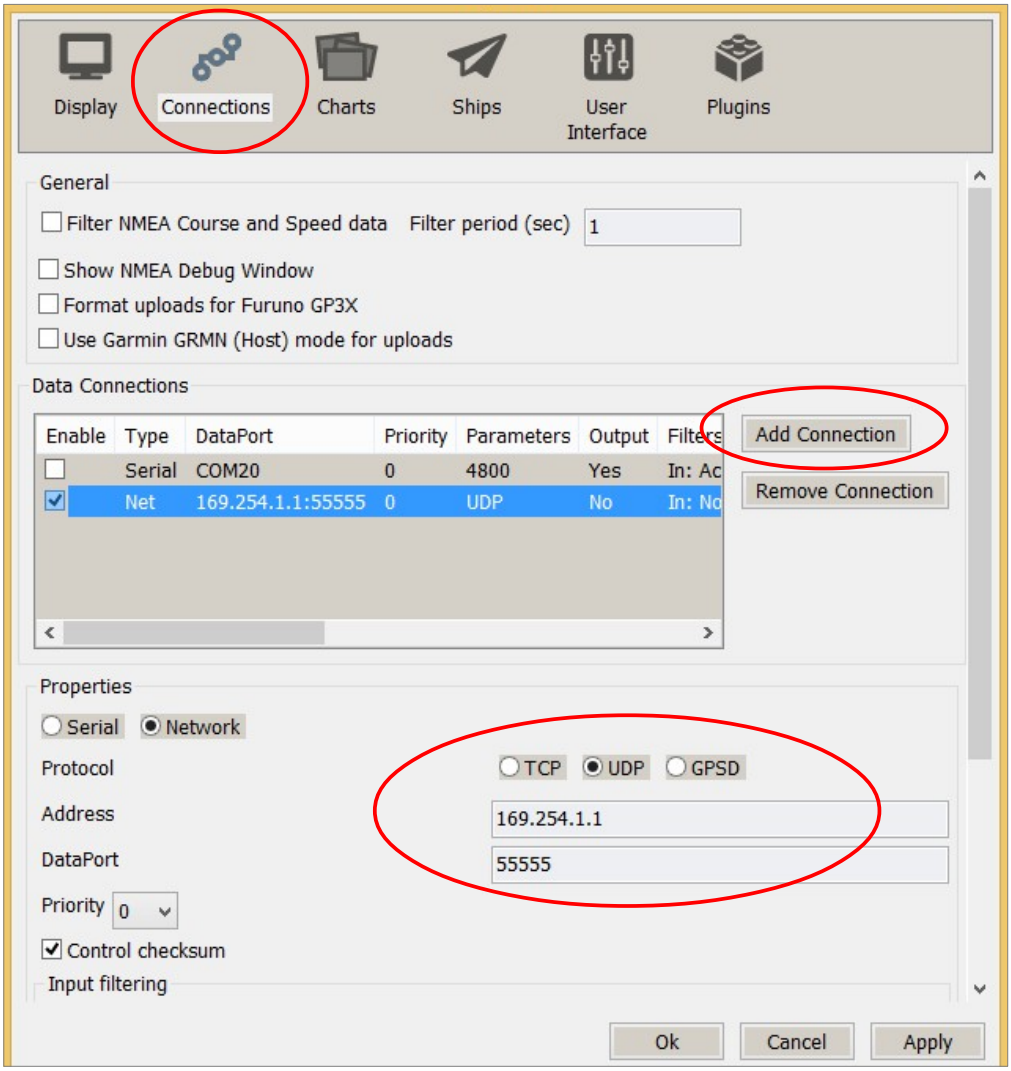


Illustration 5: OpenCPN WiFi Connection Configuration

3.1.6 Indicator Lights

There are three different light colours which the NTWB1 uses to present status information. All lights act independently of each other.

Light	State	Meaning
Red	Off	A WiFi device has connected since power on
	Flashing	No WiFi device has connected since power on
Green	Slow Flashing	No TCP connection (UDP connections may be in progress)
	On	A TCP connection is in progress
Orange	Off	No NMEA data being received.
	Flashing	NMEA data being received
	On	Continuous NMEA data being received.
Red, Green, Orange	Off	NTWB1 is off (no power being supplied to it) or sleep mode active.

Chapter 3
Operation

3.1.7 Sleep Mode (Power Saving) and Automatic Wake Up

The NTWB1 will enter sleep mode to save power if no NMEA data has been received for 60 seconds. It will automatically wake up every 5 minutes or whenever NMEA data is being received.

The NTWB1 will stay awake whenever NMEA data is being received periodically with no more than 60 seconds between datagrams.

While in sleep mode, all lights remain off, the WiFi radio is turned off and only a small amount of power will be consumed. Because the WiFi radio is off the 'Madman xxxx' SSID will not be found.
To wake the NTWB1 from sleep mode do one of the following:

- Send NMEA data to it (via the wired NMEA connection)
- Wait 5 minutes at which time it will automatically wake up
- Cycle the power to it.

3.1.8 About UDP and TCP – Which Do I Choose?

Very basically, TCP is a reliable protocol in that the data is guaranteed to be received due to two-way handshaking between sender and receiver whereas UDP is unreliable in that the sender has no way to know whether the UDP data was received (and doesn't care either). For displaying marine instrument data for information only, UDP is more than suitable as the data is regularly updated so if some UDP data is not received at one moment it is quickly replaced by new data soon after.

The NTWB1 can only make one TCP connection at a time but can make up to seven UDP connections, so select TCP if you are using only one device and UDP if you need to connect several devices.

3.1.9 NTWB1 Connections & NMEA Repeaters

The NTWB1 can make simultaneous TCP and UDP connections but only the TCP connected device will receive data from the NMEA connection of the NTWB1.
However, data from other devices can be simultaneously passed to other devices connected to the NTWB1 via UDP while the TCP connection is active. This means if you have a device running software which can act as an NMEA repeater such as OpenCPN running on a PC, you can have a TCP connection for the NMEA data from the NTWB1 to OpenCPN and then re-broadcast the NMEA data via UDP to the other devices connected to the NTWB1. In OpenCPN, create a separate 'output' network connection with IP address of 169.254.1.255, UDP protocol and a port number in the range 49152 to 65535 The other WiFi devices will need to listen to the port set in the new output connection of OpenCPN with UDP protocol and IP address 169.254.1.1

3.2 SALES & SUPPORT

For all sales and support enquiries, contact:

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E. sales@madmanmarine.com

W. www.madmanmarine.com

3.3 TROUBLESHOOTING

SYMPTOM	CAUSE	REMEDY
No lights on the NTWB1	Power not switched on.	Turn on the 12V supply to the NTWB1
	NTWB1 is in Sleep Mode (power saving mode)	Nothing need be done. The NTWB1 will wake up automatically every 5 minutes or as soon as NMEA data is received through the wired connection.
	Reverse polarity connection.	Check that +12V is going to the red wire and 0V (negative) is connected to the black wire. If not, simply swap the connections. The internal fuse will reset automatically.
Can not see the 'Madman xxxx' SSID in my available networks list.	No power etc.	Refer to the 'No lights on the NTWB1' section above
	Out of WiFi range.	Move your WiFi device closer to the NTWB1 to be within signal range.
	WiFi device 'glitch'	Try cycling the power or resetting your WiFi device if the NTWB1 is powered up (with lights on or flashing) and the SSID doesn't show up.
No NMEA data being received on my WiFi device	Not connected to NTWB1's network	Ensure the network your WiFi device is connected to is actually the NTWB1.
	No NMEA to NTWB1	Check that the orange light is flashing on the NTWB1 which indicates it is receiving data.
	App or software incorrectly configured	Ensure your app or software is listening to 169.254.1.1:55555
	TCP connection already exists	If one device is already connected with a TCP connection then no other devices will receive data (unless using a repeater such as OpenCPN)

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